

XI. *On the Genus Colias.*

By H. J. ELWES, F.Z.S., F.L.S.

[Read August 4th, 1880.]

HAVING recently had occasion to arrange the species of the Genus *Colias* contained in Messrs. Godman and Salvini's magnificent collection, and having found, as others have done before me, that the genus is an exceedingly difficult one, I offer a few notes on some of the species, in the hope that they may be useful to those who are not disposed to recognise every slight variety as a distinct species.

It is a very compact and homogeneous genus, containing, according to the views of some lepidopterists, a large number of species; but I venture to think that time will prove that many of these are but local varieties, and cannot possibly be distinguished from each other with certainty. The best proof of this is that if a large number of *Colias* from all parts of the world are mixed together, it is, in many cases, impossible to arrange them again under their supposed species. Some may be distinguished in the male sex only, others in the female. Many can only be referred to their right places when the locality from which they come is known, and as most of the local forms are variable, there will always remain, even when the habitat is known, specimens which cannot be named with certainty.

This applies specially to the North American forms, of which many have been recently described by Mr. Edwards and others; and as few or no specimens of some of these are to be found in European cabinets—or if they exist cannot be recognised—I can only follow Mr. Herman Strecker, whose catalogue of North American butterflies, recently published, seems to be drawn up with broader and more scientific views as to the value of slight variations than Mr. Edwards' catalogue, which appeared a year sooner.

Russian and German naturalists also have described many supposed species, which further investigations have proved to be identical with, or very slightly varying from, those now accepted; and I am convinced that a future

generation of naturalists will prove that what we even now accept as specific differences are not founded on fact, and that climate, food, and conditions of life will more than account for the changes in tint we see of the representative forms such as *C. Aurora*, Esp., from Eastern Siberia; *C. Thisoa*, from N. Persia; and *C. Hecla*, from Lapland; whilst insects of different broods in the same region have, no doubt, as in other cases, been mistaken for different species.

Menetries, in the *Enumeratio Corporum Animalium*, p. 77, attempts to show that the nearly allied species of *Colias* may be recognised by the shape of the inner edge of the band on the forewing in the males (he gives on plate 1 cuts of the typical shape of this in one species); but after comparing his figures with specimens, and examining this character in a number of examples of one species, I am quite unable to follow out his theory.

Menetries says that he thinks too much importance has been attached to the shades of orange in different species, and to the violet reflections on them; but this is, after all, the only means by which several of the nearly-allied forms, such as *electra*, or *aurorina*, can be recognised in the male sex, and though varying in intensity, as we see in *C. Edusa* and *C. Hecla*, it is in fresh specimens from the same locality usually constant.

In most, if not in all, of the first group we find a pale form of the female, analogous to the variety of *edusa* named *helice*, but I am not aware of any similar aberration in the male sex.

Hybrids seem to occur between some of the species, and add considerably to the difficulty of recognising them. Cf. Möschler *Wien. Ent. Monats.*, iv. p. 22, and Edwards' *Butt. North America*, ser. 2. pt. v., where a hybrid between *Philodice* and *Pelidne* is suggested. Herr Werneberg, in *Stettiner Ent. Zeit.*, 1865, p. 272, gives a revision of the European species of the genus, which he treats in a very different spirit from the majority of those who have studied it, and reduces those included in Staudinger's list to the following species: Group 1st, having the border of the forewing spotted in both sexes.

Hyale, L.

- var. *Phicomone*, Esp.
- var. *Nastes*, Boisd.
- var. *Rossi*, Guenée.
- var. *Melinos*, Eversm.

Group 2nd, having the border of the forewing spotted in the female sex only.

Edusa, Fabr.

- ab. *Helice*, ♀
- var. *Helene*, Bisch.
- var. *Heldreichi*, Std.
- var. *Feildii*, Men.
- var. *Aurorina*, H. S.

Myrmidone, Esp.

- var. *Eos*, H. S.
- var. *Libanotica*, Led.
- ab. *Thisoa*, Men.
- var. *Aurora*, Esp.

Erate, Esp.

- ab. *Pallida*, Std.

Chrysotheme, Esp.

- var. *Hecla*, Lef.
- var. *Boothii*, Curt.
- var. *Chione*, Curt.

Group 3rd, having the border of the forewing unspotted in both sexes.

Palæno.

- var. *Philomene*, H.
- var. *Europomene*, Ochs.
- var. *Pelidne*, Boisd.
- var. *Werdandi*, Zett.

He relies on the colour and form of the border, and on the discoidal spots of the hind wing for the characters by which the species are separated; but I cannot follow out his arrangement of the species in the specimens before me, and by no means agree with his conclusions; which are quite regardless of the distribution of the supposed species and varieties. His division into groups, however, seems quite natural, and is nearly identical with what I have adopted. Dr. Staudinger's arrangement of the genus in the last edition of his catalogue, 1871, is by far the best and most accurate I know of, though based on a narrower idea of specific distinctions than I can quite agree with. As, however, uncommon care has been taken in consulting all plates and descriptions, and the collection on which his

catalogue is based, is at any rate for the Palæarctic species unrivalled, we cannot do better than accept his arrangement as far as it goes. After carefully studying the very fine collection of Messrs. Godman and Salvin, which contains good series of almost all the species, together with that in the British Museum, which is rich in specimens from the arctic regions; as well as the fine though not numerous examples in the Hewitson collection, I have arranged them in the following order, which I think will be found by an unprejudiced examiner to indicate pretty fairly the principal points of distinction, and to show the geographical distribution accurately.

GROUP I.—FEMALE SEX ONLY SPOTTED ON THE DARK BORDER OF THE FOREWING.

	Name of Species and Vars.	Geographical Distribution.
	<i>C. Edusa</i> , Linn. . . .	{ Central and Southern Europe, N. Africa, and Syria.
Sub-species or local races in which the males are usually brighter or darker orange than in <i>edusa</i> , this character increasing in intensity as we go eastward.	<i>C. Myrmidone</i> , Esp. . .	{ Central, Eastern, and Southern Germany, S. Russia, and Turkey.
	<i>C. Thisoa</i> , Men. . . .	{ Mountains of N. Persia.
	<i>C. Feildii</i> , Men. . . .	{ Bhotan to Kashmir and Yarkand.
	(?) = <i>eogene</i> , Feld. . . .	{
	<i>C. aurorina</i> , H.S. . . .	{ Mountains of Armenia.
	var. <i>Libanotica</i>	{ Mountains of Syria, North Persia and Asia Minor.
	var. <i>Heldreichi</i>	{ Mountains of Greece.
	<i>C. aurora</i> , Esp. . . .	{ S.-E. Siberia and Amur region.
S. African sub-species, very near <i>Edusa</i> .	<i>C. electra</i> , L. . . .	{ Cape of Good Hope; Natal, Transvaal.
Dwarf arctic sub-species or races.	<i>C. Boothii</i> , Curt. . . .	{ Boothia-felix.
	var. <i>meadii</i> , W. H. Edw.	{ Mountains of Colorado, 10,000 feet elevation.
	<i>C. hecla</i> , Lef.	{ Greenland, Lapland.
	var. <i>glacialis</i> , MacLachlan.	{ Smith Sound.
	<i>C. chrystheme</i> , Esp. . .	{ S.-E. Europe, Asia Minor,
	(?) = <i>Vituiensis</i> , Men. .	{ S.-E. Siberia.
	var. <i>Eurytheme</i> , Bdl. .	{ United States & Territories
	var. <i>Keevaydim</i> , W. H. Edw.	{ California.

	Name of Species and Vars.	Geographical Distribution.
	<i>C. philodice</i> , Godt. . .	Eastern United States.
(Fide Strecker but seems to me more like a form of <i>palæno</i>)	<div> <div>var. <i>Occidentalis</i>, Scud. = <i>Chrysomelas</i>, H. Edw.</div> <div>}</div> </div>	Pacific States and British Columbia.
	<i>C. Erate</i> , Esp. = <i>nereine</i> , Fisch. . .	S. Russia, Siberia, Amur, Afghanistan.
South American forms differing more from the Palearctic species of this group than they do inter se.	<div> <div><i>C. Lesbia</i>, Fabr. = <i>pyrrhothea</i>, Huba .</div> <div>}</div> </div>	Argentine States to Patagonia.
	<i>C. Vautieri</i> , Guer. . .	Chili to Patagonia.
	<i>C. Imperialis</i> , Butl. .	Straits of Magellan.
	<div> <div><i>C. Dimera</i>, Doubl. = <i>erythrogramma</i>, Koll.</div> <div>}</div> </div>	Andes of Columbia and Ecuador.
	<div> <div><i>C. hermina</i>, Butl. = <i>Scalidonura hermina</i></div> <div>}</div> </div>	Andes of E. Peru.
Species of doubtful position and distinctness, but probably coming here.	<div> <div><i>C. euxanthe</i>, Feld. .</div> <div>}</div> </div>	Peru.
	<i>C. flaveola</i> , Blanch. .	Chili.
	<i>C. ponteni</i> , Wall. . .	Sandwich Islands.

GROUP II.—BOTH SEXES SPOTTED ON THE BORDER OF THE FOREWING.

	<i>C. Sagartia</i> , Ld. . .	North Persia.
	<div> <div><i>C. hyale</i>, L.</div> <div>}</div> </div>	Central and Southern Europe, Himalayas.
	<div> <div>var. <i>nilgheriensis</i> . .</div> <div>}</div> </div>	Nilgherry Mountains.
	<div> <div>var. <i>simoda</i>, De l'Orza. = <i>poliographus</i>, Motschulsky</div> <div>}</div> </div>	China, Japan.
	<i>Phicomone</i> , Esp. . .	Alps of Central Europe.
	<div> <div>var. <i>ladakensis</i>, Feld. .</div> <div>}</div> </div>	Ladak.
	= <i>shipkee</i> , Moore . .	
	(?) var. <i>melinos</i> , Eversm. .	S.-E. Siberia, Amur.
	<i>Nastes</i> , Bois. . . .	Labrador.
	var. <i>Werdandi</i> , Zett. .	Lapland.
	var. <i>Rossii</i> , Guen. . .	Boothia-felix.
	var. <i>Kokandica</i> , Ersch.	Alps of Turkestan.
(?) a distinct sp.	var. <i>Behrii</i> , W. H. Edw.	Mountains of California.

GROUP III.—BOTH SEXES UNSPOTTED ON THE BORDER OF THE FOREWING, OR THE FEMALE ONLY SLIGHTLY SPOTTED, OR THE BORDER REPLACED BY MORE OR LESS FAINT MARKINGS.

Fide Strecker	<div> <div><i>Palæno</i>, L.</div> <div>}</div> </div>	Northern Europe, Asia, and America, N. Japan, Alps of Central Europe.
	= <i>Helena</i> , W. H. Edw. .	
	= <i>Chippewa</i> , W. H. Edw. .	

	Name of Species and Vars.	Geographical Distribution.
Fide Strecker	<i>Pelidne</i> , Boisd.	British N. America, Labrador, Colorado, Canada, Anticosti, Lake Superior, B. Columbia.
Do.	= <i>Scudderi</i> , Reak.	
Do.	var. <i>Interior</i> , Scudd.	
	var. <i>Christina</i> , W. H. Edw.	
(? a good sp.)	<i>Alexandra</i> , W. H. Edw.	
Fide Strecker	var. <i>Edwardsi</i> , Behr. .	Colorado, Nevada.

American forms unknown to Strecker or myself, and not existing in his or in any English collections, are *C. Emilia*, W. H. Edw.; *Barbara*, H. Edw.; *Astria*, W. H. Edw.

N.B.—This group does not seem so natural as the other two, and perhaps connects them; for though in the female of some forms of *Paleno* and *pelidne* the border of the forewing is unspotted, in others it is so to a certain extent, or the border is entirely wanting, or indicated only by indistinct markings, as in *Alexandra*, *Scudderi*, and *Edwardsi*.

These N. American forms seem to run into each other in an inextricable manner, and to connect *Paleno* and *pelidne* with *Philodice*, Cf. Edwards' *Butt. North America*, ser. ii. part ii., under *C. pelidne*; and part v., under *Philodice*. Cf. Schilde, *Stett. Ent. Zeit.*, 1873, pp. 169—75.

Mr. Edwards, in his beautiful work, gives excellent figures of all these forms; but so far from clearing up the question of their distinction, he seems to me to make the question infinitely more difficult, as I am quite unable to appreciate the characters on which he relies, or to define the limits of the three species, even supposing that we allow only three, as above, instead of seven or eight as he does.

I do not think that all the species which are mentioned above can invariably be recognised with certainty, and I am certain that many of the varieties could not; yet, as for the most part they have a fairly well-defined range, they may be allowed specific rank for convenience' sake, and in the absence of full information as to their larval states. Speaking broadly, there are, with the exception of the Neotropical species, which are confined to the Andean ranges and temperate regions of the south, three well-defined species of *Colias*, representing the three groups which I have formed. These are nearly confined to the Palearctic and Nearectic regions, which, as far as butterflies are concerned, are inseparable. They are *C. edusa*, *C. hyale*, and *C. paleno*. The first and last of these vary exceedingly,

and have developed a number of constant local varieties, whilst other varieties do not appear to be fixed, and all are much influenced by local conditions. *Paleno* and its forms are pretty nearly confined to the colder regions of Europe, Asia and America. *Edusa* takes its place in more southern and warmer regions, though it also has developed arctic forms, like *Hecla* and *Boothi*. *Hyale*, with its forms, is confined to the Old World, though its arctic and alpine representative nastes spreads into the northern parts of North America.

As regards the species in Group I., *C. edusa* seems to be smallest in Syria and largest and brightest in the South of Europe.

To *Myrmidone*, which does not extend to Northern or Western Europe, it is very closely allied. As we go east it develops other forms, such as *Thisoa*, *aurorina*, *Feildii*, and *aurora*, gradually increasing in brilliancy.

In South Africa it appears in the form of *electra*, which though distinguished in the male sex by the tint of the orange, in the female sex may easily be confused with the females of the Himalayan form *Feildii*. Near this latter there are specimens from Ladak, in the British Museum and in Mr. Moore's collection, differing considerably from the usual Himalayan form found in Kashmir, Nepal, and Sikkin; but I should not like to separate them specifically without knowing more about them.

Another supposed species, differing from *Feildii* in its paler colour, and having some slight difference in the discocellular marks, has recently been separated by Moore as *C. Stoliczkana*, from Ladak, and another from Turkestan has been described as *C. Staudingeri*. A female from the Punjaub is very near the Grecian *Heldreichi* (for the varieties of which consult Staudinger on the Lepidoptera of Greece and of Asia Minor, in Horæ Ent. Ross).

C. aurora, first figured and described by Esper, from specimens sent by Bober from Nertchinsk, and afterwards found at Kiachta on the border of the Gobi desert, and on the Amur river by later travellers, is the brightest in colour of any of the genus, and though, according to my views, only a local race of *Edusa*, is very easily distinguished from any of the other varieties, by the extremely bright fiery orange in the wings of fresh males, and as it appears from the figure of Boisduval, in the females also (though I have seen none of this colour). In Mus.

Godman and Salvin are two females from the Amur of the pale form, figured by Eversmann, Bull. Mosc. 1847, t. 4, figs. 3 and 4, as *C. chloe*. This form is evidently the analogue of the var. *helice* in *C. edusa*.

Females appear to be rare, as there are none in the Hewitson or British Museum collections.

As regards *C. chrysotheme*, Esp., it seems to agree very closely with some of the varieties of *Eurytheme* from California and Texas, though, if we consider it as the same species, the geographical distribution is remarkable, *Chrysotheme* being confined to South-Eastern Europe, some parts of Asia Minor, and Eastern Siberia. I cannot distinguish between specimens of *Chrysotheme* from Pesth, and of *Keewaydon* from California.

Colias Boothii Curt., Ross, 2nd Voy. App. Nat. Hist. p. 65, Pl. A., 3-5, 1835; Guenée Ann. Ent. Soc. Tr. 1864, p. 198.

C. Chione Curt., l. c. p. 66:

This species or variety is only known from the specimens collected in Captain Ross's second expedition to the arctic regions, at Repulse Bay and in Boothia-felix, where it is said to be abundant for about a month in July and August on *Oxytropis campestris*, and *O. arctica*, which are probably the food plant of the larva.

They have been considered by all writers as a good species, on account of the very narrow border of the wings, which is entirely absent in the var. *Chione*.

I am doubtful, however, whether this last, of which three specimens from Repulse Bay are in the British Museum collection, are not rather a form of *C. Boothii*, or a hybrid between that and *Nastes*.

Colias Hecla, Lefebvre Ann. Soc. Ent. Tr. 1836, p. 383, Pl. IX. B. fig. 3-6.

C. Hecla, var. *Glacialis*, McLach. J. L. S. Zool. 14, 108, 1879.

This species, which is found on the high fells of Lapland, in Greenland, and Arctic America, is, from my point of view, only a dwarfed local race of *C. Edusa*.

The variety of it described by McLachan from Hayes Sound, lat. 79° N., and from Grinnell Land in lat. 81° 45' N., are probably the most northern specimens known of this germ, and are much paler in tint and duller in their markings than the Lapland variety.

C. erate is a puzzling species, which, though distinct enough in Southern Russia, appears to have a tendency for crossing with other species, such as *Edusa* and *Hyale*.

From Candahar Mr. Butler has recently described no less than four supposed species and varieties (see P. Z. S. 1880) nearly allied to this; but, after examining the specimens in question, I can only say that I entirely fail to follow his distinctions. Those which he calls *Erate*, from Candahar, agree closely with examples from South Russia and the Punjaub.

What he calls *Helichta* of Lederer has in the male more of the orange tint of *Edusa*, and may, as was originally supposed, be a hybrid between it and *Erate*. What he calls *Sareptensis*, Staud., seems identical with the form of *Hyale*, found in the Himalayas, China, and Japan, under the names of *Simoda*, De l'Orza; *Poliographus*, Motsch.; Pauens, Butl., &c.

Of what he calls *Pallida*, Staud., the female seems like *Hyale*, or a pale female of *Erate*, and the male a small specimen of the latter species.

Colias Lesbia, Fabr. Ent. Syst. iii. i., 208, 652; Butl. Cat. Fabr. Pl. II., fig. 2, 1870; Burm. Desc. Phys. Rep. Arg. Vol. V., p. 95.

C. pyrrothea, Hubn. Exot. Schm. Zutr. ii., 28, 183, fig. 365, 366.

C. heliceoides, Capron. Ann. Soc. Ent. Belg. t. XVII. 13.

This species, first described by Fabr. from a ♀ specimen in the Banksian collection taken in the Straits of Magellan during his voyage with Cook in 1790, is common, according to Burmeister, all over the Argentine Republic, from the Straits as far north as San Paolo in S. Brazil (Rodgers in Mus. Godman and Salvin).

The females vary, but not enough, according to Burmeister, to allow them to be considered as sub-species, the males being very similar. One ♀ from Coralitos, Entre Rios, in Mus. Godm. and Salv., is as dark, and almost exactly similar to the ♀ of *Meadii*, while others are pale, like the var. *Helice* of *Edusa*.

The caterpillar lives on *Medicago sativa*, according to Burmeister. Two male specimens of this species in Mus. Godm. and Salv. are marked Chili (Reed), but as it is not included in his work, I conclude they are from Mendoza, or some locality on the east side of the Andes.

Colias Vautieri, Guer. Voy. Coq. Pl. XV., fig. 2, 1829, ♀; Blanch. Gay Faun. Chil. vii. p. 18, 1852; Reed Mariposas, Chil. p. 15, 1877.

C. rutilans, Boisd. Sp. Gen. i. p. 642, Pl. XIX., fig. 3, 1836; Blanch. Gay Faun. Chil. vii. p. 18, t. I. f. 7 a b, 6, ♂; Reed Mariposas Chilenas, t. I. fig. 3, 4, ♂ ♀.

This species, in which the ♂ and ♀ differ remarkably from each other, the latter resembling the pale ♀ of *Lesbia* in markings and tint, whilst the ♂ have something of the brilliant tints of *C. electra*, is, according to Reed, common through the whole of Chili, from Atacama to the Straits of Magellan.

The figure of the ♀ given by Reed is coloured much more darkly than any I have seen, the yellow being almost covered by the black of the border.

Colias flaveola, Blanch. Gay, Chili, vii. p. 19., t. I. fig. 6 a b, Reed Mariposas Chilenas, p. 18.

The description of this species in Gay does not say anything as to the sexes, whilst the figure seems to represent a ♀. It is said by Gay to have been taken at Coquimbo, but Reed has never seen a specimen, and there is none in any collection I have seen, though a female from Bolivia collected by Buckley in Mus. Godm. and Salv. somewhat resembles it.

Very possibly this is not a good species, but only a small aberrant female of *dimera* or *Vautieri*.

Colias Imperialis, Butl. P. Z. S. 1871, p. 250, Pl. XIX.; Reed Mariposas Chil. p. 16.

This fine and distinct species is easily distinguished by the broad black border on the wing in both sexes, which extends to the anterior margin of the hind wing.

It is only known to me from three specimens in the British Museum, collected at Portfamine, about the centre of the Straits of Magellan.

There are specimens of *C. Lesbia* from this locality in the British Museum, and others of what appears to be *Vautieri*, though it has a narrower border than Chilian specimens from Sandy Point, a little to the north-eastward. We therefore have three apparently distinct species of *Colias* meeting in the Straits of Magellan, so that a large

series of specimens showing their variations and possible hybrids would be of great interest.

Colias dimera, Doubl. Hew. Gen. D. L. t. IX. fig. 3, 1847.

C. erythrogramma, Koll.

(?) *C. euxanthe*, Feld. Reise. Nov. Lep., II. p. 196 (1865).

This species, which may be easily recognised by the pale colour of the hind wings, which are of a very different colour from the fore wings, and by the blood-red spots and streaks on the under side, which are conspicuous in most specimens, is found in the equatorial Andes of New Granada, and perhaps Venezuela. Specimens from Bogota are common in museums.

The species described as *C. euxanthe*, by Felder, I cannot identify with certainty in the absence of a plate. It is described as being very near *C. dimera*, but differing in the shape of the wings, and larger. There are four specimens in the Hewitson collection, under the name of *euxanthe*, from Ecuador and Peru, which may belong to *C. hermina* or to *dimera*, or may be a distinct species. There are also two Chilian specimens in Mus. Godm. and Salv. which I cannot identify with any known species, so that a more complete account of the South American *Coliades* is much to be desired.

Colias (Scalidoneura) hermina, Butler, P. Z. S. 1871, p. 250, Pl. XIX., fig. 5.

This obscure species, on which Mr. Butler has founded the genus *Scalidoneura*, appears to be very rare in collections.

The type specimen which I have examined in the British Museum is from Peru, and is probably from the same locality as two specimens in Mus. Godm. and Salv., which were collected by Whiteley at Pozuzzo or Pozuzu, a branch of the Ucayale River, on the Upper Amazon, and situated in about lat. 10° N., long. 75° W.

It appears to be very closely allied to *C. dimera*, and can only be recognised with certainty by the slightly different branching of the costal nerve towards the apex, on which, as it seems to me, insufficient character Mr. Butler has founded the genus *Scalidoneura*.

In all other respects it appears to be a true *Colias*, only distinguishable from *dimera* by the narrower border of the

fore wings, and by the colour of the hind wing not differing from that of the fore wing, as it does in *Dimera*.

There is a specimen in Mr. Hewitson's collection which may possibly be the ♀ of this species; but in the imperfect light of the building I was unable to detect the difference in the neururation.

Colias hyale seems confined to the Old World, no form of it having been discovered in the New, though it spreads over most of Asia, and has received numerous specific names.

In the British Museum collection Mr. Butler indicates no less than four forms of this species, all of which he considers distinct, from Japan—viz., *Simodu*, *Poliographus*, *Pallens*, and another. He professes to be able to distinguish them with certainty, but I entirely fail to follow him in doing so. Probably special training is necessary to enable one to appreciate such minutiae; but in any case it would be most unlikely that in such a genus four species of one group should exist in Japan alone, or rather in that very small part of Japan from which collections have come.

Hyale extends to the Himalayas, to China, at any rate as far as Shanghai, into South India, under the name of *Nilgheriensis*, and is said by Layard to have occurred in South Africa, though I know of no authentic specimens from that country.

C. Sagartia Led., from the mountains bordering the south end of the Caspian Sea, seems a good species, nearly allied to *Phicomone*, and representing it in Asia, but easily distinguished by colour and size from that species.

Colias ladakensis, Feld., Reise. Nov. Lep. II. p. 197,
Pl. 27, fig. 8, 9, 1865.

C. shipkee, Moore, P. Z. S., June 13, 1865, p. 492,
t. XXXI. fig. 13.

There seems to be little doubt that these two supposed species are identical, though the figure of *Shipkee* is not good.

There are two specimens from Ladak in Hewitson's collection named *C. Vautieri*!!! and two others in the British Museum from Tibet, apparently ♂ and ♀, which all agree very well with Felder's plate.

It seems to me a local race of *C. Nastes* or *Phicomone*, though easily distinguished by its bright lemon colour.

As regards the correct name of the form, I adopt Felder's, because it is the most scientific, and because the part of the P. Z. S. in which *C. shipkee* was described, though read in June, would not have been published till the end, or near the end, of the year, and therefore probably be later than Felder's description, the date of publication of which seems not quite certain.

This is an essentially alpine form occurring at elevations of 14,000 feet and upwards in the dry region of Ladak.

C. melinos Eversm., from the Amur region, is perhaps another form of *Phicomone*, but is very imperfectly known as yet, and may be a distinct species.

The various forms of *Nastes* are puzzling, and if I am right in referring *Kokandica* Ersch and *Behrii* Edw., to this species, the distribution is still more so. I am somewhat doubtful about the last of these forms, which Mr. Strecker considers distinct. I fail to see any good character by which *Nastes* can be distinguished from *Phicomone*, of which it may be only an arctic form. The var. *Werlandi* from Lapland is just as likely to belong to one as the other, though *Phicomone* as found in the Alps of Central Europe does not seem to have so much tendency to variation as most of the species.

Colias Pelidne. Boisd. Ic., p. 41, Pl. VIII. figs. 1—3.
(1832.)

I adopt Boisduval's name instead of the name *Anthyale* Hubn., which is given to it by Staudinger, because the latter expressly states in his account of that species that it comes from Pennsylvania, which in my opinion proves his *Anthyale* to be a small specimen of *Philodice*, God., Cf. Mosch. Stett. Ent. Zeit., 1870, p. 113.

This supposed species, which comes very close to *Palceno* on the one hand and to *Philodice* on the other, is found in Labrador, British Columbia and Colorado; but various forms of it which have been described as distinct species under the names of

Colias interior, Scud. Proc. Bost. Soc. Nat. Hist. ix. p. 108, from South Labrador and Anticosti,

C. Christina, W. H. Edw. Proc. Ent. Soc. Phil. II. p. 79, Brit. N. Am. I. t. II., from British Columbia,

C. Scudderi, Reak., Proc. Ent. Soc. Phil., iv. p. 217,

C. Philodice, var. *Laurentina* Scud. Proc. Bost. Soc.
Nat. Hist. p. 4, Oct. 1875, from Lake
Superior,

are found in other parts of North America; and according to Mr. Strecker's catalogue and to what I can see from the figures and descriptions, they are at most but local varieties of one species. Indeed, I cannot see how the numerous forms of *Paleno*, *Pelidne* and *Philodice*, found in North America, can be assigned with certainty to one or other of these species; and the confusion of names which exists is so great, that without access to the principal collections in the United States, it seems to me impossible to unravel them.